

Introduction

The vast majority of British companies have been faced throughout the post-war period with a recurrent labour shortage problem; it has been particularly acute in certain areas and for certain types of skill. Labour shortages have often contributed to lengthening order books; shortages of particular categories of workers have often resulted in inadequate plant utilisation, dislocation of production and rising costs.

In many firms wages and salaries form a large proportion of total costs; if excessively high they can impede a firm's ability to sell competitively and to maximise its profitability.

To make the most of this scarce and costly factor of production, firms need to give close attention to the efficient use of manpower. The need is equally important from a national angle. Labour shortage has been a root cause of wage inflation—in the last ten years incomes have increased at three times the rate of the real gross national product; wage inflation in turn has contributed to high selling prices, to poor export performance and to recurrent balance of payment problems.

How efficient is British industry in the use of manpower?

In the last few years the development of inter-firm comparison whether within British industry or on an international basis has afforded evidence of a wide variation in manning standards. International comparisons have indicated weaknesses of performance in British firms in a variety of industries. In one large international organisation output per head in the British factories is approximately half the figure achieved in two North American factories; this can only in part be explained by differences in plant. In another industry a Canadian factory is producing a sales value per head 50 per cent higher than a British factory in the same group manufacturing a similar product with similar plant.

Within British industry there would seem to be a wide divergence of standards; one large group in the engineering industry with a national reputation for its efficiency, has a highly developed system of measuring labour efficiency within each factory; it has been found to vary from a 'high' of 92 per cent to a 'low' of 54 per cent. In another company the actual man-minutes taken to make a given product have been shown to exceed the theoretical minimum by 52 per cent, 97 per cent and 156 per cent respectively in three factories. Similar variations occur in other firms and industries.

These national and international comparisons indicate plentiful scope for raising the standard of utilisation of manpower. It has been suggested that under-employment even among the more efficient companies is in the region of 10 to 15 per cent but clearly it is not spread evenly throughout all industries and firms. If the standard of all firms could be raised to that of the highest the problem of labour shortage would largely disappear.

What forms does the inefficient use of manpower take?

Inefficient use of manpower can take many forms and can arise from a variety of causes:

Problems of numbers

Often too many people are employed on the job:

because labour is hoarded for fear of recurrent labour shortages;

because the number employed for a given level of output has been maintained in spite of changes in methods of work;

- because individual directors and managers think their status is relative to the number employed;
- because of trade union insistence on the number required to operate a machine and on the retention of demarcation between jobs;
- because of workers' resistance to changes in methods.

Many instances can be given of excessive manning: the steel works which found it had a surplus of 900 maintenance mates; the firm which reduced its office staff by 380 out of 3,500; the 34 per cent excess of staff—identified by the Royal Commission on the Press in 1962—in the London offices of four national newspapers.

Problems of flexibility

Poor training arrangements may hinder the flexibility of labour; in particular companies often make inadequate provision for re-deployment and re-training following changes in demand, in product or in methods of manufacture. In such cases there may be a tendency to retain more labour than is needed on the old job. Equally, lack of flexibility may arise from union or worker resistance to change of job or of employment. In one company a change in method of manufacture meant that fewer men were required in a particular section. The employees in the section refused to countenance any transfers to other departments and for a period of some 12 months all the men insisted on sharing the work between them and therefore each working a four-day week. Such resistance may arise from fear of redundancy or of loss of earnings; the fact of such resistance may itself deter management from action.

Problems of wages

In many firms excessive overtime is worked, caused not so much by production requirements as by the need of men on low hourly rates to boost their earnings. Management often condones the situation. In such circumstances the men may hold back their effort in order to spread the work into overtime hours, resulting in increased labour costs and the lowering of the hourly rate of production. The extent of unnecessary overtime was indicated at one company which changed the method of payment so that employees had a higher base rate and shared in a plant productivity bonus; overtime then fell by 25 per cent. In another factory men in the warehouse had for a considerable period worked regularly all day on Saturdays and Sundays; after the introduction of an incentive scheme the same amount of work was achieved but overtime was limited to Saturday mornings.

Incentive schemes, based on work measurement, can contribute substantially to productivity; in certain circumstances, however, the operation of piecework may lead to restriction of effort, e.g. when an operator holds back his level of production in order to protect a loose piecework price. The extent of restriction of effort was indicated in one department of a firm when, as part of a new agreement with management, shop stewards persuaded the employees to raise their 'norms' of output by 15 per cent. The operation of piecework may also encourage resistance on the part of the individual worker to any change in job because he fears that he may suffer a drop in piecework earnings.

Problems of production organisation

Difficulties of production planning and control may lead to waiting time by operatives; such difficulties may arise through delays in the supply of materials; through the provision of faulty components or through a complex product mix requiring constant job changes and re-setting of machines. Inadequate maintenance may result in temperamental machine behaviour or plant breakdown and thus cause waiting time or poor operator performance. In the case of one costly piece of machinery, plant utilisation in a British factory is 75 per cent of the theoretical maximum, compared with 93 per cent in a similar factory in the U.S.A. The difference is attributed to a greater diversity of products and a lower standard of maintenance in the British factory.

Problems of plant and product specifications

Output per man-hour may also be impeded by over-designed products, by excessive scrap, by lack of standardised methods, by the use of obsolete plant, by poor layouts and methods of materials handling. Substantial improvements in manpower utilisation could be achieved by the installation of more modern plant. Layouts in British factories often compare poorly with standards amongst the best of our overseas competitors and contribute to an excessive use of indirect labour.

Underlying all these forms of inefficient use of manpower lie weaknesses in management performance, trade union restrictive practices and workers' resistance to change. In the Group's view over-manning in much of British industry stems more from management weaknesses than from trade union restrictive practices. Certainly key importance must be attached to management's performance because with management lies the initiative and the responsibility for effecting improvements.

Determining the best cost balance between plant and labour utilisation

The optimum cost balance needs to be established between labour, plant and materials. It may be uneconomic to seek the minimum expenditure in the use of manpower if this detracts from the optimum use of expensive capital equipment. The combination of capital and labour can be varied to give the same output. In relative terms, for instance, six units of capital and one unit of labour may achieve the same output as three units of capital and three units of labour or even one unit of capital and six units of labour. By examining the prices of the two factors the total costs of the different combinations can be worked out and the one with the lowest total cost selected.

One large engineering firm has calculated that it is worth investing £5,000 in new plant in order to save one worker. Another company expects savings in wages to meet the cost of new plant within two-and-a-half years.

How to establish the correct manning

The Contribution of Work Study

Systematic measurement is the basic method of determining the labour required for a job or product; by establishing a standard time for a job the actual result can be compared with the standard.

It is essential before establishing times to examine the methods of operation of the existing plant and equipment in order to ensure that they are as good as possible, i.e. the aim should be to set the standard for the immediate optimum use of the existing factors of production.

How can the time be established? This is not the place to describe work measurement techniques in detail; they are well known in industry and have been described in many books. A variety of methods can be used such as:

Detailed time studies, e.g. for short-cycle repetitive operations.

Observation, e.g. of long-cycle process operations in the chemical industry.

Activity sampling, e.g. of the work involved in a stores.

The build-up of synthetic times, e.g. for complex small batch jobs through the establishment of predetermined times for the various elements—times can be established, for instance, for boring by size and depth of hole or for welding by inch of weld.

Measurement is most commonly applied and most successful in relation to direct workers, but it also needs to be applied to indirect workers; the problems of measurement, however, are greater as the amount of work performed does not vary directly with output, e.g. setters, and the time required may be difficult to predict, e.g. maintenance work. Whatever the operation studied and whatever the technique used, time is the essential element—it is a constant item, its value remains the same and it is therefore the most useful way of expressing the result of work measurement.

Having measured the work for a number of different operations and having set a standard time for each of these operations, these standard times can then be added together to give a total standard for the complete unit of production or a standard for a number of products if these differ from one another. Standard utilisation is thus expressed in time per unit of production. Multiplying this by the actual production over the past week or month will give the standard hours which should have been used for the actual production. A detailed and systematic comparison, week by week, of actual and standard performance provides a firm basis for remedial action.

Various methods of measuring labour utilisation are in fact employed, the choice being based on the character of production and the particular needs of the particular company. (See Appendix B.)

While a work study department staffed with trained and experienced work study specialists is essential for the large firm and where mass production techniques are used, it may not always be considered appropriate where relatively few are employed or production is essentially of a one-off character. The general principles of work measurement are, however, valid in any type of organisation; the factory manager or foreman can do much to establish manning standards; for instance, a foreman knows what performance can be expected on a particular machine and can thereby make a rough and ready estimate of the man hours required for a given operation or level of output. His estimate may be the more objective if he has also received some training in the techniques of work measurement. When a firm is engaged predominantly in small batch production much can be achieved by observation, by recording standard times for particular elements of jobs and by using these standard times again when the elements are repeated in subsequent orders. It cannot be emphasised too strongly, however, that the establishment of realistic standard times in the absence of a professional work study engineer involves a high degree of management competence and objectivity.

The Contribution of Costing Techniques

Cost control techniques can also help in establishing manning standards; they have the advantage that cost, i.e. £ s d is a measurement universally used and understood. Money provides a unit of comparison of labour, materials and plant costs; it also indicates wage drift. Its disadvantage is that unlike time its value is not unchanging; in the post-war period it has suffered significant depreciation.

Cost control figures provide a breakdown of fixed and variable costs and can be used to establish cost activity ratios (i.e. the standard cost for a given level of production) and also the ratios for direct and indirect labour costs in relation to a given volume of output or given value of sales. Usually the basis for such ratios is past performance; the budget for the future is thus based on the past which may itself have been characterised by poor manning standards. Cost control figures in themselves therefore provide a measure of deviation from the budget but not necessarily the deviation from the optimum standard. The need remains for:

- (a) a critical examination of methods to maximise the use of existing plant and equipment;
- (b) a critical examination of the manning required for a given level of production.

Cost control techniques are most valuable when linked to a system of work measurement; together they provide an invaluable method of identifying poor manpower utilisation.

How can poor manpower utilisation be improved?

Immediate Action

The well-established management practice of comparing actual performance with targets, standards or budgets is believed to be the best means of improving

management control and raising standards of performance in the production process. A variety of control documents may be used, some related to time standards, some to costs.

In one large company the following control documents are produced weekly:

- (1) A departmental labour audit sheet for each departmental manager showing variations from standard time and cost in constituent operations, and the major reasons for losses.
- (2) A departmental scrap report identifying the amount and incidence of waste and comparing actual cost with budgeted cost.
- (3) A maintenance cost control document comparing the actual costs with the budgeted costs within a department.
- (4) A departmental expense cost control report showing conversion costs per unit of output (i.e. conversion from raw materials to finished goods) in terms of actual and budgeted costs broken down under the general headings of Waste, Labour and Variable Expenses.
- (5) A summary for directors showing conversion costs per factory; this is produced by a Wednesday for the previous week and is designed to give a quick approximate comparison between actual and budgeted total factory costs.

Additionally, an inter-factory comparison report is compiled comparing material, labour and other costs for a specific product—and so providing a means of identifying the best way of undertaking each operation.

Another large group uses a similar set of control documents; it also establishes a quarterly productivity index for each factory which reflects output (in tons) per man and such additional factors as the average hourly rate of earnings, staff/works ratio, productive/non-productive worker ratio and labour turnover. Each factory is required to set itself cost reduction targets.

How can management best ensure that action is taken on such control documents? At one firm on receipt of the departmental weekly rating sheet (or labour audit) the foreman is expected to call in his chargehands for an examination of all deviations from standard performance; it is the foreman's responsibility to eliminate losses and maximise performance. At such a meeting the work study officer, personnel officer or other specialist is available for consultation, e.g. regarding the effort observed or the quality of labour recruited. The foreman also receives a record of the daily piecework performance of all operatives. Copies of the various departmental weekly rating sheets are issued to the factory manager, together with a summary document which includes a profitability statement. Together these provide him with his means of control. At a higher level still the production director of each subsidiary company is, once a quarter, summoned to a main Board meeting to account for the labour utilisation index for his factory. By these various means senior management encourages a close and constant watch of performance figures and systematic action to secure improvements.

Some improvements are securable by line management, whether at the level of factory manager or foreman, by immediate action in relation to production operations; other improvements can only be secured by more detailed studies by specialists; it may be for instance that a detailed examination is required of

marketing policy in order to determine whether the diversity of products manufactured could be reduced; it may be that production planning needs improvement, perhaps by the adoption of critical path analysis, in order to minimise delays through product mix or material supply; it may be that an improved system of preventive maintenance is needed to reduce the time lost through plant breakdown; it may be that improvements in training are required to speed the learning process for new workers and those transferred to other jobs; it may be that complexities of design can be eliminated so that methods of manufacture and assembly are simplified.

Sometimes improvements can only be secured by a team effort; some factories have found it helpful to establish cost reduction teams, or product improvement teams, whereby a group of specialists, e.g. cost accountant, design engineer, work study engineer, meet under the chairmanship of a departmental or factory manager to examine methods of raising standards of performance. For best results such teams need to have authority for expenditure on improvements within specified limits. Shop floor participation in special departmental productivity committees can also yield benefits.

Various examples can be given of savings effected through these various means; in one firm, for instance, automatic mandrel lubrication was installed on two mills for an expenditure of £1,200; four men were saved. In another case a review of maintenance work led to a reduction in the manning of the maintenance department by 16 per cent: surplus mates were identified, mates were trained as improvers, and the union accepted certain jobs which could be undertaken by a mate without the attendance of a skilled man; considerable savings were effected. In yet another instance an application of operational research techniques identified the fact—obvious to all when pointed out and yet previously unrecognised—that in a steel works two locomotives were being used per shift each travelling the same route, one travelling to the mill loaded with scrap metal and returning empty, the other carrying the finished steel from the mill but returning empty. Clearly only one locomotive and the attendant team was needed per shift.

In yet another company comparisons of labour utilisation figures in different factories making the same product indicated that the main causes of poor performance were:

- (a) Apparently small differences in product or process specification which in total had a substantial effect on manufacturing times.
- (b) Minor differences in equipment and tools, inexpensive to improve, but again significant in total effect.
- (c) The various factors which come under the general heading of shop floor management, including failures of production planning, control of absenteeism and attention to scrap problems.

Management came to the conclusion that restrictive labour practices were not a serious factor, and that the best results were achieved where management had put the greatest efforts into manpower utilisation.

Action to improve manning of indirect and clerical operations

Much less attention is normally given to the efficiency of indirect than direct labour both in terms of establishments and costs. One company has estimated

that its indirects could be reduced by one-fifth; another has established that the direct labour cost of a particular product is 4s 0d but all other labour costs excluding research and development amount to 27s 0d. The application of work study could yield significant savings.

In clerical employment there is a strong tendency to growth in spite of the increasing use of computers. This has been shown by the Ministry of Labour's Manpower Research Unit which has forecast that by January 1974, after offsetting posts taken over by computers, 400,000 more clerical office staff would be needed. It is vitally important to use clerical labour efficiently. One firm, by the application of work measurement, is reducing clerical costs by 20 per cent.

How can routine clerical operations be reduced? Four techniques have yielded considerable savings:

(1) Much time can be saved in the recording of figures and the completion of forms by a work simplification approach. In one firm's export department a master stencil has been produced suitable for recording all the information required for transmission to a variety of departments and outside organisations. In another factory all production figures are now recorded automatically by a telecontrol system operated by one man.

(2) Recording by exception is a useful means of reducing clerical operations; the only figures recorded are those which show a significant deviation from standard performance. In a building firm, for instance, site agents are only required to submit cost returns to head office when they indicate a performance falling outside specified limits.

(3) Standards of accuracy can sometimes be eased without any significant loss of control. For instance, accountants may demand accuracy in stock-keeping to the last halfpenny though this may cost more than it saves; overstaffing results. At one company it was decided to issue small items from stores on free issue; the cost of issue in terms of stores labour was 2s 0d per item. By putting small items on free issue, a saving of £3,000 per annum was effected in stores labour. The quantities used also declined.

(4) Reductions in the amount of filing undertaken can produce substantial clerical savings. In most companies papers are retained which are never needed again; various copies of a report are filed in separate offices when only a master copy is needed for future reference.

Special problems exist with regard to non-routine clerical work. Senior management clearly need information on which to base decisions but there may well be a tendency for special studies to be requested too frequently. Such special studies are often useful in providing a retrospective examination of what has gone wrong and a means of determining future appropriate action; occasionally they are demanded in order to postpone a difficult decision. The introduction of computers has brought added difficulties; because more information can quickly be made available more is demanded. To combat this tendency one company has undertaken studies, prior to the introduction of an integrated system of data processing, to determine precisely what information is needed from the computer; it is hoped realistically to limit the amount of data to be processed.

The establishment of organisation and methods departments could do much to provide satisfactory control of clerical operations. Closer attention needs to be given to work measurement and effort rating in the offices. Establishments are at present usually based on historical accident; instead they should be determined by measurement and kept constantly under review. The determination of standards would also provide a yardstick against which the performance of office departments could be measured; in the majority of firms no such yardstick at present exists, though significant examples can be cited of the benefits achieved in particular firms through the application of measurement techniques to staff work. Real problems do, however, arise in determining the numbers required; in a drawing office time is often spent sitting and thinking or looking at a particular machine on the shop floor. Time spent in this way may be valuable or may be sheer idling; it is difficult to distinguish between the two. One company considered that it could probably reduce its drawing office staff by 25 per cent without lowering the standard of work.

Improving Manpower Utilisation—Industrial Relations Implications

The application of various management controls invariably reveals many areas where improvement is required. Action may be delayed because changes in existing practice may be opposed by the unions and result in protracted and often difficult negotiations. Indeed in some firms so much time is spent by shop floor management in negotiations (e.g. about piecework prices) that inadequate attention is given to improving departmental performance.

The operation of payment systems causes much friction between management and men and can also encourage loose manning standards. This area of conflict might be reduced—and wage drift contained—if managements were to review payment structures in the light of the type of production technology and market conditions and on a basis of objective standards, e.g. of job evaluation and work measurement.

Some of the difficulties of negotiation undoubtedly arise from such general problems of industrial relations as the structure of trade unions, the lack of clarification of bargaining rights and procedures and the frequency of unofficial strikes. Many firms have experienced increased pressure from the shop floor in the last few years; it has made managerial innovation more difficult. Even so, many managements experience no real difficulty in gaining union agreement to changes involving reduced manning schedules.

At a large steel works it was decided to replace the old open hearth furnaces by electric arc furnaces, a change which would make about one thousand men surplus to requirements. Management announced these plans several years ahead of their implementation, so that ample time was allowed for full consultation with employees for the negotiation of manning and wage rates on the new plant and the redeployment of the remaining men. The new plant was installed smoothly with full employee and union co-operation.

Efficient manning and satisfactory employer-union relations may be promoted by the following means:

- (1) Plans for improvement in plant and methods need to be pursued actively and drawn up well ahead of the date of implementation.
- (2) The nature of the plans and the reason for them need to be discussed with employees at an early date, i.e. well before implementation.

(3) Management should actively seek to remove employees' feelings of insecurity by demonstrating whenever possible that inherited fears of change are generally ill founded, thus preparing employees to accept more readily the consequences of economic, technological and social change. This can best be done in companies which are seen to adopt progressive employment policies.

(4) Management may wish to formalise bargains at plant level, with agreements signed by management and shop stewards as well as full-time union officials. A definition of bargaining areas might help reduce inter-union conflict. It is desirable that such plant agreements should include a statement of management-union rights and of an employee appeals procedure.

Long term action to improve manpower planning

A company needs to plan its future manpower. A manpower plan should be based on an objective analysis of the numbers required to man the plant for the projected production. Companies with experience in this field usually plan for three to five years ahead. Account is taken of such factors as age structure, retirement rates and labour turnover; anticipated changes in the volume and character of sales, in the products and methods of manufacture; the potential of the existing labour force. Such manpower plans are most frequently undertaken for skilled workers, supervisors and executive grades; they need to come under the control of a senior member of management. Manpower planning is a valuable part of disciplined management thinking; it helps to identify future manpower scarcity and to indicate training needs. At the same time its accuracy often leaves much to be desired because of the difficulty, in some industries, of making sound predictions about the level of sales, or of foreseeing changes in local labour market conditions.

Management's responsibility for the efficient use of manpower

What needs to be done within management to raise standards of manpower utilisation? Management at all levels needs to be more strongly motivated to recognise the opportunities for improving manpower utilisation, and needs to direct a higher proportion of its efforts to this end. In particular, attention needs to be given to the contribution of control techniques and to the competence of management and supervision.

(1) There is an urgent need to extend the use and raise the standard of such control techniques as Work Study, O & M, Operational Research, Value Analysis; by such means individual operations can be critically examined, standards established and improvements secured. An extension of such

control techniques will create a demand for more people trained in their operation. Companies will not be able to rely on buying such skill on the open market; instead they will need to send members of their own staff on appropriate external training courses.

(2) Much depends on the competence of superintendents and departmental managers who should be able fully to understand the control techniques employed and the specialist functions involved, to analyse the information provided and to initiate relevant remedial action. Co-operation between departmental managers and foremen on the one hand and specialists (e.g. in work study) on the other, does not stem just from mutual goodwill, rather it depends on the emphasis placed by top management on the specialist techniques and on the creation of an appropriate organisation structure. In large firms a departmental manager may be supported by his own team of specialists. In smaller companies the factory manager may himself hold regular meetings of his departmental managers and foremen and the work study specialist to examine in detail the problems being experienced and to determine remedial action.

(3) Departmental managers and superintendents need to be of high calibre; many of the present difficulties arise because in the past they were frequently recruited from the ranks of foremen who lacked educational and technical qualifications. Planned education and training is vital for such members of middle management and for the specialists who support them. It can be provided by external courses and by day-to-day guidance within the company.

(4) The role of the foreman varies according to such factors as the type of production process, size of firm, the span of control. Often the foremen are best recruited from the shop floor but their practical experience needs support by effective training to equip them to meet their various responsibilities and to operate the relevant procedures. Again such training may in part be provided by sending foremen on external courses and in part by approaches within the firm. One large company has been training its foremen systematically for some twenty years; prior to appointment they undergo a six-months' training programme in which there is considerable emphasis on the operation of the various control techniques. These foremen have developed a high sense of responsibility for standards of manpower utilisation within their sections and are keen to secure improvements.

(5) Sound communications within management are an essential pre-requisite for improvements in company performance. Communication down the organisation line can ensure that everyone understands the nature of the problem and what is expected of him. Improved communications up the line can help to identify specific obstacles to progress.

(6) It is equally important to give attention to managerial competence within the office. In large firms an organisation and methods department is essential and should be under the control of a senior member of management. One company appointed such an administrative controller; the application of O & M and O R techniques led to a significant reduction in the ratio of clerical workers to turnover. Standards of management in offices often leave much to be desired. Office sections are frequently small, e.g. consisting of four or five clerks, with the result that supervision is less effective than in the works. Further problems may arise when a section is headed by a specialist rather than a manager, e.g. a cost accountant. There is much to recommend

centralisation of offices so that an effective manager can be employed. Centralisation of clerical functions can also promote simplification of procedure; centralisation also stems naturally from the use of a computer. Office managers and supervisors should be properly trained in their responsibilities; in some firms they attend the same training courses as works supervisors. Members of senior management are also sometimes to blame for the lack of attention given to the offices; they should talk as frequently to office supervisors about the performance and effectiveness of their departments as they do to factory foremen.

(7) If effective managerial performance is to be attained senior management must ensure that each manager and supervisor knows and accepts the objectives of his job and has sufficient authority to realise his responsibilities. In some large firms young managers are being given full responsibility for a particular product so that they are encouraged, in co-operation with the specialists within their team, to maximise productivity and profitability.

(8) High calibre effort should be devoted to thinking ahead on personnel/industrial relations/manpower problems. Time devoted to forward thinking on the industrial relations aspects could well result in management being able to take initiatives *vis-à-vis* the unions which at present seem impossible.

Special problems of small firms

Large firms enjoy the benefits of specialist staff; very small firms enjoy the benefits of personal control by one man; in between come the majority of firms which may be too large for control by one man and too small to employ specialists. Problems may also arise because employers of small firms may be satisfied with a limited return on capital, perhaps because they are alarmed at the capital cost involved in changes designed to raise profitability, and may therefore accept the retention of old fashioned plant and methods and the employment of an excessive number of workers.

Are specialists' techniques applicable to the smaller firm? Obviously the small organisation cannot support a whole spate of specialists—indeed the uncritical application of specialist control techniques could result in a small unit going into the red. But the principles of specialist control systems are of general relevance; what is needed is their application in a manner suited to the size, structure, product and technology of the company.

Two main methods are open to the smaller unit in introducing specialist control systems; firstly, it may engage a firm of consultants to install the particular techniques; this approach has the advantage of speed and expertise as reputable consultants have wide experience of the application of these control systems in a variety of situations. They can also train members of management and supervision in the operation of the control techniques. Alternatively, the firm may choose to select an appropriate member of staff for specialist training and send him on a full-time external course, e.g. a two- or three-months' course in work study. This approach has the advantage of relative

cheapness but results in a slower application of the techniques by a man without the experience of consultants. Whichever method is adopted it is essential that existing members of management and supervision receive training and guidance in modern management control systems so that they understand the techniques which are available, recognise their own responsibility for the performance of their departments and acquire a sense of urgency in securing a high level of efficiency.

Only in such ways can the vitally needed improvements in the efficient use of manpower be secured.

Summary of conclusions

- (a) The efficient use of manpower is of vital importance to the national economy.
- (b) Manpower utilisation varies widely between one enterprise and another in Britain, and even between factories or departments within a company.
- (c) The key factor in improving manpower utilisation is the performance of management.
- (d) There is a need for more conscientious use of the well-known techniques of work measurement, labour standards and cost controls.
- (e) The techniques which have been used with success for many years in improving direct labour utilisation need to be applied more widely to indirect labour and office functions.
- (f) Labour/management negotiations and consultation at factory level can contribute substantially to productivity improvement.
- (g) Training of specialists and production management in techniques of work measurement and cost control needs to be extended and improved.
- (h) There is a need for improved communications to ensure that the problems and objectives of the enterprise are fully understood throughout the management group and, where appropriate, among shop stewards.
- (i) The need for profitable operation of a company must be widely understood and accepted by all.

Appendix A : Questions for management

1 Standard Times

Are existing methods of measurement adequate for the establishment of standard times for direct and indirect workers? (Pages 6-7.)

2 Cost Control

Is there a cost control system in use, and is it linked with work measurement? (Page 7.)

3 Documentation

Is there a system of documentation available to supervision and, in summary form, to directors, covering, e.g.

Departmental variations from standards

Scrap reports

Comparison of actual with budgeted costs

Productivity improvements?

Is action taken upon these reports? (Pages 7-9.)

4 Staff Functions and Clerical Operations

Are staff functions and clerical operations included in systematic investigations into manpower savings? (Pages 9-11.)

5 Industrial Relations

Have steps been taken to ensure that industrial relations problems arising out of improved manpower utilisation are fully considered? (Pages 11-12.)

In particular, have positive steps been taken to remove employees' feelings of insecurity by good communications, proper re-training, etc? (Pages 11-12.)

6 Long-Term Action

Have steps been taken to draw up a manpower plan three to five years ahead for all levels of the organisation? (Page 12.)

7 Management

Have the necessary staff been recruited, or trained, to ensure that the control techniques needed, e.g. Work Study, O & M, etc. can be operated satisfactorily? (Pages 12-13.)

Has a training programme for management and supervision been introduced to ensure familiarity with these techniques? (Page 13.)

Appendix B: One company's approaches to measuring labour utilisation

One large company in the engineering industry uses three methods.

(1) Measurement by department

The foreman of each production department is given a weekly departmental rating sheet which analyses and measures in terms of hours or money various factors affecting departmental performance. These include hours worked and wages earned by direct and indirect workers; hours lost with reasons; value of items scrapped; value of consumable tools and material, and maintenance costs. Against most of these items actual results are set alongside the standard. Ratings are shown for output, for labour utilisation and for quality of production. These provide a yardstick for comparing performance from one week to another while the detailed analyses of the various items produce the evidence on which the foreman can plan remedial action. From time to time the standard is changed as plant methods and materials are altered.

(2) Measurement by product

The calculation is based on the establishment by work study of a standard labour time for a whole product. Measurement is of direct labour only. A labour utilisation index is obtained by dividing standard hours by actual hours and multiplying by 100. To determine the productivity index, however, note has to be taken of technical factors. A technical index can be compiled by considering possible changes in machines, materials or methods, by estimating production hours needed under these proposed changes and by dividing this number of hours by present standard hours and multiplying by 100. From these two bases a productivity index can be obtained reasonably simply by dividing the estimated hours after technical improvements have been made by actual hours using current methods and multiplying by 100.

Example: If standard time for a product = 4 hours

If current actual time for the product = 5 hours

and if estimated standard time after technical
improvement = 3 hours

then $\frac{4}{5} \times 100$, i.e. 80 = current labour utilisation index,

$\frac{3}{4} \times 100$, i.e. 75 = technical index, and

$\frac{3}{5} \times 100$, i.e. 60 = productivity index.

(3) Measurement of a complete manufacturing unit

The index in this method is produced mainly by means of observations on the factory floor. The labour utilisation index is obtained through five steps. These are:

STEP 1 Designated W (for Working)

Step 1 produces a numerical value which represents a rough approximation of the effectiveness in the use of labour at the time it is being checked. Observer/s walk around each section of the factory and account for every operator who is working. At the end of the tour the total number of operators clocked in on the sections observed is ascertained. Thus two figures are now available:

- (a) The number of operators in the factory actually working.
- (b) The total number of operators clocked in on the observed sections.

Expressed as a ratio $\frac{a}{b}$ gives the first numerical value, and as an example say

$$(a) = 900 \qquad (b) = 1,000$$

Then the ratio becomes $\frac{a}{b} = \frac{900}{1,000} = 0.9$

STEP 2 Designated R (for Rating)

In practice Step 2 is carried out at the same time as Step 1 but for the purpose of clarity and because of its special significance it is explained separately. Here the observer/s state the level of effort of all operators observed working. There is no problem here for observers who are trained in the technique of effort rating but a firm having none trained in work measurement could set up its own concept of a good effort and attach a numerical value to it. The observers could then carry out Step 2 using a simple verbal statement and afterwards converting to a numerical value, e.g.

Numerical Conversion

Effort = Excellent	.	.	.	120
Effort = Very Good	.	.	.	110
Effort = Good	.	.	.	100
Effort = Fairly Good	.	.	.	90
Effort = Fair	.	.	.	80
Effort = Poor	.	.	.	70

For the purpose of the example select Good = 100 and to keep the result of each step in the same terms divide by 100. Therefore 'R' in this example = 1.0.

STEP 3 Designated EW (Effective Working)

In the previous steps those operators observed working have been effort rated. The answer to Step 3 will produce a modifying factor to adjust the index for the incidence of non-productive working. The data will be obtained from routine administrative records, for example the salvaging of components from scrapped work, rectification work or work in the nature of extra handling the time for which is in excess of the accepted standard time. The hours booked to this non-productive work are collected from the data sheets in respect of those sections under review. The total clocked hours in respect of the same group are also extracted from the data sheets. The hours booked to non-productive work are subtracted from the total clocked hours leaving a figure which can be associated with the clocked hours to form a ratio which will serve as a modifying factor.

The modifying factor is
$$\frac{\text{Clocked Hours} - \text{Non-productive Hours}}{\text{Clocked Hours}}$$

For the example, say, hours on non-productive work = 4,000
and clocked hours = 40,000

then $EW = \frac{36,000}{40,000} = 0.9$.

STEP 4 Designated ML (Managerial Losses)

So far the operators actually working have been accounted for, their rate of working has been established and a modifier has been produced which will take account of the effect of non-productive working. All of this has looked at the use of manpower while it is working. Step 4 brings in the non-working area. Time is lost through late starting and early finishing at the beginning and ending of shifts and before and after tea breaks and lunch intervals. Time lost in this way is attributable to lack of managerial control. The extent of this loss is recorded by observers and is the numerical value obtained in Step 4.

For the purpose of the example let us say that each operator lost 2 hours per week due to lack of managerial control and take 40 hours as the normal working week. Deduct 2 hours from 40 hours leaving 38 hours. The ratio $\frac{38}{40}$ provides a modifier which will take account of the effect of managerial lost time. For the example the value is $\frac{38}{40} = 0.95$.

STEP 5 Designated CR (Compensate Rest)

It would be unrealistic to take the four values derived from the preceding steps and proceed to compute the labour index. A fundamental working principle is that operators must be allowed time for rest and personal needs. The 5th Step therefore is to establish the appropriate compensating factor. In light engineering, the usual allowance for fatigue and personal needs is 10 per cent.

In the example, therefore, the factor 1.1 will be used.

Calculation of the Labour Utilisation Index: Using the symbols to state the general formula

$$\text{LU Index} = W \times R \times EW \times ML \times CR \times \frac{100}{1}$$

or to use the figures selected for the example

$$0.9 \times 1.0 \times 0.9 \times 0.95 \times 1.1 = .8465 \times \frac{100}{1}$$

say 84.7 against an objective of 100.

To put this in another way, if the objective is realistic then about 15 per cent of the manpower available for productive work is being lost.

The Application of the Three Methods

These three methods provide useful alternative means of measuring labour utilisation.

The first method—of measurement by department—has the advantage of requiring remedial action at the level of immediate responsibility, i.e. departmental manager or foreman.

In the second method the productivity index of 100 expresses a target to be achieved; it can be changed as required and provides a method of comparing performance and progress between products and factories.

A labour utilisation index of the third type measuring a complete manufacturing unit is of particular value as a means of inter-factory comparisons within the same group of firms; it is useful as a means of generating enthusiasm for improvement whether within the factory or in comparison with other factories.



MINISTRY OF LABOUR

Efficient Use of Manpower

Report of a Study Group composed of directors and senior
managers of well-known firms in the Midlands



LONDON

HER MAJESTY'S STATIONERY OFFICE

1967

Foreword

Just over a year ago a number of directors and senior managers from firms in the Midlands, at the invitation of the Ministry of Labour's Regional Industrial Relations Officer, formed a small study group to examine means of securing more efficient use of manpower at plant level.

Although some time has elapsed since their meeting, the subsequent experience of the members of the Study Group has confirmed the findings of their Report. It has become even clearer than when the Report was written that the more efficient deployment of labour resources in each individual firm would make a substantial contribution to increased productivity and would go a long way towards solving the difficulties with which, as a country, we are faced. The responsibility for the effective use of manpower resources is one of the most challenging facing modern management, the significance of which has been underlined in recent months by the requirements of the Prices and Incomes Policy. It is thought that in these circumstances the Report of the Study Group will be of interest and practical value to many other managers, and the Ministry of Labour is grateful to the participants and their firms for permission to publish it.

The views put forward in the Report are essentially those of the Study Group members, who were as follows:

- A. J. NICOL (*Chairman*): Group Personnel Director, Joseph Lucas Limited
- E. L. ARCHER: Personnel Manager, Boots Pure Drug Company Limited
- A. BRYAN: Managing Director, Josiah Wedgwood and Sons Limited
- H. L. FARRIMOND: Personnel Manager, Imperial Metal Industries Limited
- W. R. C. FROST: Director of Personnel (Steel Tube Division) Tube Investments Limited
- R. J. W. GILBERT: Group Work Study Engineer, Joseph Lucas Limited
- H. J. HEBDEN: Director of Personnel and Industrial Relations, Massey Ferguson (Manufacturing) Limited
- N. L. J. MOULD: Production Director, The Dunlop Company Limited (U.K. Tyre Group)
- R. O'BRIEN: Director of Industrial Relations, British Motor Corporation Limited (now Industrial Adviser, Department of Economic Affairs)
- R. W. PFENDERLEITH: Group Administrative Services Manager, Cadbury Brothers Limited
- G. RILEY: Assistant General Manager, Stewarts and Lloyds Limited, Bilston

The Study Group was assisted by Mrs. J. M. Collingridge, Regional Industrial Relations Officer, and S. Hemingway, Industrial Relations Officer, of the Ministry of Labour's Midland Regional Office.

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